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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/520,109

01/03/2005

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R.303095

9548

2119 7590 10/27/2009
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EXAMINER

TRAN, DIEM T

ART UNIT

PAPER NUMBER

3748

MAIL DATE

DELIVERY MODE

10/27/2009

PAPER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte NORBERT BREUER and STEFAN FISCHER

Appeal 2009-001020
Application 10/520,109
Technology Center 3700

Decided: October 26, 2009

Before LINDA E. HORNER, JOHN C. KERINS, and MICHAEL W.
O'NEILL, *Administrative Patent Judges*.

O'NEILL, *Administrative Patent Judge*.

DECISION ON APPEAL

Norbert Breuer et al. (Appellants) seek our review under 35 U.S.C. § 134 of the final rejection of claims 20-22, 24-29, and 31-41. Appellants argued the § 103 rejection of 20-22, 31-39, and 41 and the § 103 rejection of claims 24-29 and 40. In view of Appellants' arguments presented in the

Appeal Brief, the Examiner indicated that claims 24-29 and 40 were objected to as being dependent upon a rejected base claim, *see* Ans. 2. Accordingly, the Examiner has withdrawn the rejection of those claims. *See* MPEP § 1207.02. We have jurisdiction under 35 U.S.C. § 6(b) (2002).

The claimed invention is to an apparatus for cleaning exhaust gas from an internal combustion engine. Spec. 1, ¶ 0002.

Claim 20, reproduced below, is illustrative of the subject matter on appeal.

20. A method for purifying the exhaust gas stream in the exhaust gas line (7) of an internal combustion engine (1), of particles such as soot, the exhaust gas stream being enriched with ozone, the method comprising the steps of effecting a continuous enrichment of the exhaust gas stream with ozone such that particles that are present are to a great extent oxidized during the flow through the exhaust gas line (7), measuring at least one of the temperature of the exhaust gas and the particle content of the exhaust gas downstream of the enriching, and controlling the concentration of the ozone essentially as a function of at least one of the temperature and the particle content of the exhaust gas, such that the remaining particle content of the exhaust gas stream does not exceed a predetermined limit value.

The Examiner's rejection that is now before us for review is the rejection of claims 20-22, 31-39, and 41 under 35 U.S.C. § 103(a) as being unpatentable over Birckigt (US 6,938,409 B2, issued Sep. 6, 2005) in view of Caren (US 6,321,531 B1, issued Nov. 27, 2001).

The dispositive issue for this appeal is whether the scope and content of the combination of Birckigt and Caren renders obvious the claimed limitation of controlling the concentration of the ozone essentially as a

function of at least one of the temperature and the particle content of the exhaust gas.

Birckigt is directed to having diesel engine exhaust gases flow through a ceramic soot filter such that the particles contained in the exhaust gas are deposited and then oxidized to regenerate the filter. *See* Birckigt, Abstract. As the Examiner has directed our attention, *see* Ans. 4, the plasma regeneration of the filter can take place continuously and the plasma power requirements are dictated by a function which causes the power to drop as the filter temperature rises, and to rise as the emission of the particulates rises. Birckigt, col. 4, ll. 49-52. The Examiner finds that this passage in Birckigt satisfies the parts of the claimed method with respect to: effecting a continuous enrichment of the exhaust gas stream, not with ozone, but with an electric gas discharge, such that particles that are present are to a great extent oxidized during the flow through the exhaust gas line; measuring at least one of the temperature of the exhaust gas and the particle content of the exhaust gas downstream of the enriching; and controlling the concentration of electric gas discharge, instead of ozone, essentially as a function of at least one of the temperature and the particle content of the exhaust gas, such that the remaining particle content of the exhaust gas stream does not exceed a predetermined limit value. *See* Ans. 4. The Examiner then finds that it would have been obvious to utilize, in the Birckigt apparatus, Caren's teaching of generating ozone in a reaction chamber and to supply the ozone to the exhaust gas in order to provide "a highly reactive gas species ozone necessary to purify harmful emissions...." Ans. 4.

While, in the grounds of rejection, the Examiner acknowledges that Birckigt fails to use ozone, the Examiner finds, in the Response to

Argument, that Birckigt produces ozone based on several inferences. *See* Ans. 7. Appellants reply that the Examiner's finding that Birckigt produces ozone is an error in fact and explain the theory behind Birckigt's process that reduces the levels of particle emissions. Reply Br. 2.

Birckigt breaks down the particulates on the filters by inducing electron collisions with oxygen in a non-thermal plasma discharge to produce oxygen free radicals. The oxygen free radicals react with the carbon on the filter surface and form a surface bonded carbon monoxide. Carbon monoxide forms carbon dioxide by a further oxidation process. Birckigt, col. 6, ll. 4-30. As such, Birckigt does not describe producing ozone.

The Examiner's logic is flawed with respect to finding Birckigt generates ozone. It is not reasonable or technically sound to infer that ozone is necessarily produced in Birckigt, solely on the basis that one of the Appellants' manners of making ozone is with plasma generation and that Birckigt uses plasma generation in its process of filter regeneration. Further, we cannot find, nor has the Examiner cogently explained, how, if ozone is produced, Birckigt would use the ozone to enrich exhaust gas downstream, much less control the concentration of the ozone essentially as a function of the measured temperature and/or particle content of the exhaust gas downstream of the enrichment.

Caren describes using a corona discharge device to produce free radicals and related gaseous species to reduce pollutants in an exhaust gas stream. Caren, col. 11, l. 45 to col. 12, l. 65. One of the related gaseous species that may be produced, depending upon the hydrocarbon species present in the exhaust gas stream and whether conditions favoring branching

reactions are present, is ozone. *Id.* The free radicals and gaseous species are introduced preferably upstream of the catalytic converter. *Id.* Oxidation occurs and essentially yields an exhaust stream free of any material other than carbon dioxide, water, nitrogen, and methane. *Id.* While Caren discloses that ozone may be produced, there is no disclosure, nor has the Examiner cogently explained, how the ozone concentration would be controlled, in either the Caren apparatus or the Birckigt apparatus, as a function of temperature and/or particle content.

Accordingly, the combination of Birckigt and Caren fails to render obvious controlling the concentration of the ozone essentially as a function of temperature and/or particle content of the exhaust gas, such that the remaining particle content does not exceed a value limit.

In view of the foregoing, Appellants have demonstrated error in the Examiner's findings with respect to the scope and content of the combination of Birckigt and Caren.

DECISION

The Examiner's decision to reject claims 20-22, 31-39, and 41 is reversed.

REVERSED

Appeal 2009-001020
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mls

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